

Application of the DMAIC method in a pipe steel company: a case study

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Abstract This work described the application of the Six Sigma quality management tool in a medium pipe steel company with problems of high product return rates. Thus, the DMAIC method was used to identify the problem, as well as to propose an action plan, created from its phases. This project brought, then, the view of managers in the application of this tool, which, generally, is used in large organizations, such as multinationals. As a result of the study, a reduction in the return rate was observed, permeating lower costs and better customer service.

Keywords: Six Sigma, Quality, Returns.

1 Introduction

According to Golás et al. (2016), for companies to survive, it is important to improve the quality of products and services in order to satisfy the customer's needs, in addition to reduce or eliminate errors, defects or failures. Therefore, there are tools such as Six Sigma, which is an innovative quality management methodology that was implemented at Motorola in the eighties (EVANS; LINDSAY, 2014).

Six Sigma aims to achieve quality management based on statistical methods and tools that assist the analysis of the processes. Despite the success of the application of this tool in many businesses, this method may be impractical in some situations of smaller companies (KURATKO; GOODALE; HORNSBY, 2001).

DMAIC is one of the methods used in the Six Sigma tool. It consists of five steps (define, measure, analyze, improve and control) that allows a good visualization of the problem, not to mention the implementation of improvement strategies to minimize the issues found (MONTGOMERY, 2009).

In this context, this work aims to discuss the issue at a Steel Pipes company in Guarulhos-SP, as it had its goods returned. Therefore, this project describes the application of the Six Sigma tool in identifying product returning causes, proposing an action plan and implementing the solution based on the phases of the DMAIC model in a medium-size business. Which is a challenge since this method is usually used in large companies.

As for this paper, a study case was selected as a researching method. According to Yin (2017), the case study research is one of the several ways to develop research in the social sciences. Therefore, in this case study, the DMAIC tool was applied to identify the root causes for an existing problem in order to propose solutions that would help the company. For this study, the quality manager, commercial manager and the CEO of the company were interviewed.

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2 Presentation and Outcome Analysis

When applying the DMAIC in an organization, it was noticed that the returns were due to some complaints, which were divided into technical and commercial aspects, respectively. The first ones were caused mainly by the failure in the selection of the material or because the amount sent was not in accordance with the customer's request, resulting in some draw-back in the factory. Commercial complaints, on the other hand, were caused by the error in the order issued by the seller or by the failure in the critical analysis of the order, that is, the commercial area was the origin of the error.

An improvement plan was established in order to reduce these products returning numbers. This plan was implemented through technical and commercial training for the employees. In September, when the training sessions were held, the number of returns reached 28; 21 in October; 26 in November; decreasing to 17 in December and 14 in January. Thus, there was a considerable improvement in comparison to September, which was the worst month in number of returns in 2019.

Through internal supervision, carried out in order to control what was done by the salespeople after the training, it was identified that they were not yet issuing the order and critical analysis correctly. However, there was an improvement and the result of applying the tool in the company was positive since the returns decreased.

3 Conclusion

It can be concluded that there was an improvement in the number of returns, and this generated a decrease in freight costs with returns that occurred when a product was delivered in disagreement with the request made by the customer. This project had reduced application time during the planning execution. The computed results were only taken into account four months after the improvement plan was achieved, so only short term results can be considered.

This work is analyzing the application of DMAIC in a medium-sized company, while reinforcing the relevance of practicing this methodology in an organization different in size from most companies. In the context of the analyzed company, the adaptation and most expressive use of quality tools is more suitable.

4 References

- Evans J, Lindsay W (2014) An introduction to Six Sigma and process improvement. Cengage Learning, Stanford (2014).
- Gołaś H, Mazur A, Mrugalska B (2016). Application of risk analysis and quality control methods for improvement of lead molding process, *Metalurgia* 55:811-814.
- Kuratko D, Goodale J, Hornsby J (2001) Advantage in Smaller Firms. *Journal of Small Business Management*, 39: 293–311.
- Montgomery D (2009) Introduction to statistical quality control. John Wiley & Sons, Jefferson City.
- Yin R (2017) Case Study Research and applications: design and methods. Sage Publications, Los Angeles.